

IF THIS DRAWING IS NOT 3/4\"/>

## HVAC SPECIFICATIONS

### REQUIREMENTS

All mechanical work shall be free from defects in workmanship and materials for a period of one (1) year from date of final acceptance and shall meet all local and state codes. All details, which develop or are discovered within this period shall be required by the Contractor to the satisfaction of the Engineer and at no additional cost.

### GENERAL

- The Contractor shall examine the site of the proposed work to determine the existing conditions that may affect his work.
- It is the intention of the Contract Drawings and Specifications to call for finished work, tested and ready for operation. All materials shall be new and of first quality.
- All material, work, incidental accessories or other details not shown but necessary to make the work complete and perfect, and in all respects ready for operation, even if not specifically specified, shall be provided by the Contractor at no additional cost.
- The Contract Drawings are generally diagrammatic and are intended to convey the scope of work and indicate general arrangement of ductwork, packages, and induction units. Detailed ducts, pipes, valves, etc. that are damaged during the construction period, whether or not due to the Contractor's negligence, shall be repaired or replaced by the Contractor and left in a condition satisfactory to the Engineer.
- Coordinate locations of all ducts with architectural reflected ceiling plans.
- The space around pipes, ducts, etc. containing water shall be protected with 1/2\"/>

### MATERIALS TO BE RETURNED TO THE AUTHORITY

- The Contractor shall deliver all excess material as shown below to a designated area in the W.T.C. complex as directed by the Engineer.
- one (1) 1/2 capacity induction unit

### DUCTWORK

- All ductwork shall be furnished, installed and fabricated in accordance with the latest edition of the SMACNA Low and High Velocity Duct Construction Standards Manual, using prime sheets of galvanized steel. All square elbows shall be fabricated with turning vanes on minimum 4\"/>

### ACOUSTICAL DUCT LINER FOR INTERIOR DUCT SURFACES

- Application: Acoustical duct liner shall be installed on the interior surface of the ductwork from the discharge connection of the HVAC equipment for a minimum distance of 10 feet.
- Material:
  - One inch thick rigid fiber glass duct liner board.
  - Insulation, including adhesive, shall have a composite fire and smoke hazard rating as tested by procedure ASTM E84, NFPA 255 and UL 723 not exceeding a "Flame Spread" of 25 and a "Smoke Developed" of 50. Johns-Manville "Unifloacoustic F" or approved equal.
  - Insulation shall have a density of 1.5 lbs. per cubic foot with a thermal conductivity of 0.025 BTU-inches/ft<sup>2</sup>-hr-F at 75 F mean temperature.
  - The duct liner shall have a NRC of no less than 0.70 based on No. 6 mounting. (Test Method C423) and suitable for air velocities up to 2000 FPM.
- Installation:
  - Apply duct liner to duct surfaces with 100% coverage and approved adhesive.
  - The black surface of the liner shall face the air stream. All joints shall be snug and neatly beaded.
  - All exposed edges and joints shall be heavily coated with approved adhesive. A metal nailing shall be installed on all leading edges of the liner.
  - On ductwork over 12\"/>

### FLEXIBLE DUCT CONNECTIONS

Flexible duct connections for ductwork shall be made of an approved frame resistant fabric having a flame spread rating of not over 25 and a smoke development rating of not over 50 and shall not exceed 10 in. in length.

### INDUCTION UNITS

- Support and fasten units to prevent air vibration, providing all required wall brackets, supporting legs and leveling devices. Units support method shall be subject to the approval of the Engineer and be similar to the method used for the existing units.
- The Contractor shall adjust induction unit performance as shown on the contract drawings.
- The air connection to the induction units shall be made with "Thermax" Type S-TL or approved equal, or approved equal, of size shown, but not less than 1/2\"/>

### PIPING

All piping connecting to the induction unit shall be Copper ASTM B-88, soft (annealed) Type L and fittings shall be standard weight copper and solder type. All soldered joints shall be made with 95-5 Tin Antimony Solder having a melting point greater than 450 Deg. F. All soldered joints shall be thoroughly cleaned before the application of the solder. All insulation shall match existing.

### VIBRATION PAD

Vibration pad shall be "Shear Flex-Plate" as manufactured by Vibration Mountings Control Inc. or an approved equal.

See also specifications for Anemostat-Waterloo or an approved equal. All details shall be checked white enamel.

- Diffusers (Supply): Diffuser for diffusers shall be Model DOB.
- Dampers: Diffuser for diffusers shall be Model DOB.

### WATER COOLED AIR CONDITIONING UNIT

- Furnish and install packaged air conditioning unit. Unit shall be complete with temperature control, compressor, evaporator coil, condenser water regulating valve and other system components required to provide proper air conditioning for the space designated on the Contract Drawings. Filter shall be Class F, UL listed; 45% efficiency.
- AS Unit shall be furnished with the following accessories:
  - Condensate Pump
  - Disconnect Switch
  - Thermostat

### Schedule

Unit	Blower	Auxiliary	Condensing Water	Model	Total
No.	Motor	Motor	GPM	No.	Weight
AC-1	1/2 HP	1/4 HP	80 DPM	508A008	770lbs.

AC Unit motor shall be 3 phase and for 480 volts. (MEA No. 91-70-E)

AC Unit motor shall be 3 phase/208 for 450 volts. (NEA No. 91-70-E)

- The Unit shall be factory run, tested and rated in accordance with ARI Standards.
- AS Unit shall be complete with water regulating valve. Valve shall be Metric WCHW type or approved equal. It shall be a positive shut-off type and shall be rated for 150 psi. working pressure.
- Unit shall be similar or equal to Carrier Inc. and rated at 150 lbs. working pressure.

### REGULAR INFORMATION SHEET

Install and install on AC unit a new St-Peter Ionization filter 48\"/>

### PIPING AND ACCESSORIES

- TEST REQUIREMENTS (Aux. Cooling Water)
  - Operating Pressure: 150 PSIG
  - Operating Temperature: 85 Deg. F - 95 Deg. F
  - Hydrostatic Test Pressure: 1.5 x Operating Pressure
  - Duration of Test: 2 hours

Isolate equipment, controls, instruments and valves from the piping system during hydrostatic tests

### B. Piping & Fittings

System	Pipe	Fittings
Aux. Cooling Water	Black Steel Pipe, Conforming to ASTM A-53 Schedule 40 Grade B, Black Seamless	2-1/2\"/>

<b>A.C. Unit Condensate Drain</b>	<b>Copper ASTM B-88 Hard Temper Type (L)</b>	<b>Wrought Copper Solder Joint 5 ANSI B16.18</b>
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Vent auxiliary cooling water piping at all high points.

### C. Accessories

- Unions for auxiliary cooling water piping shall be similar and equal to 250 lb. class, malleable iron with bronze seats, Grinnell Figure 554, U.L.
- Nipples 6\"/>

3. Braided type flexible connector shall be Vibration Mounting and Control Inc. (VICO) Model MFP Style NIE Max. 250 psi or approved equal.

### D. Soldered Joints

95-5 Tin-Antimony Solder having a melting point greater than 450 F. Excess solder shall be removed while still in the molten state with a file left at the face of the fitting.

### E. Thermometers

- Thermometers for piping shall be of the "all angle" (universal), separate socket, industrial type with #304 stainless steel extension neck walls.

2. The thermometer for auxiliary cooling shall operate at 0 - 160 Deg. F. range and shall include a sufficient safety margin at either end.

3. Thermometers shall be as manufactured by Albert A. Weiss, Weisker Instrument Co., Ashcroft or approved equal.

### F. Pressure Gauges

- Pressure gauges shall be of the Bourdon tube spring type with 4-1/2\"/>

### G. Strainers

Strainers shall be similar and equal to those manufactured by Muller Steam Specialty Co. 3/4\"/>

8. Cutting and Patching, Sleeves and Escutcheons

- Pipe passing through walls shall have a trim opening cut no greater than necessary for the installation of a sleeve secured therein. Sleeves shall be 1/2\"/>

2. Pipe passing through floor slabs shall have an opening core drilled 1/2\"/>

3. Annular spaces between pipes or sleeves or core drilled floor openings shall be packed with thermobar and sealed to retain the fire integrity of the walls and floors with a non-hardening compound similar and equal to Duxseal as manufactured by J. M. Clippard Co.

4. All piping passing through walls, floors or ceilings shall be fitted with chromium plated cast brass escutcheons with fastening set screws similar and equal to Fee & Mason Manufacturing Co., F & S Manufacturing Co. or Filter Pattern and Casting Co.

- Pipe Supports and Hangers
  - All supports and hangers shall conform to the latest requirements of the ANSI Code for pressure piping B31.10 and MSS standard practices SP-55.
  - Hangers shall be manufactured by Grinnell Co., Central Iron, Fee and Mason, Blawnox Co. or an approved equal.
  - Pipe hangers, rods, inserts and clamps shall be those approved for their respective uses by the Underwriters Laboratories, Inc.
  - Unless otherwise specifically approved, hanger size and spacing shall be:
 

Pipe Sizes	Max Hanger Spacing	Minimum Rod Sizes
1/2\"/>		

	2-1/2" to 3-1/2"	10 ft. o.c.	1/2"
	4" to 5"	12 ft. o.c.	5/8"
	6"	12 ft. o.c.	3/4"
	8" to 12"	12 ft. o.c.	7/8"
<b>copper</b>	1/2" to 1-1/4"	6 ft. o.c.	3/8"
	1-1/2" to 2"	8 ft. o.c.	3/8"
	2-1/2" to 3-1/2"	10 ft. o.c.	5/8"

### J. Valves

J. Valves			Jenkins	Crane	Stockham
1. Type	Size	Pressure	Fig. No.	Fig. No.	Fig. No.
Gate	Up to 2"	125 psi.	477U	428-UB	B-105
Gate	Up to 2"	150 psi.	49U	431	B-128
Gate	Up to 2"	280 psi.	280U	634E	B-144
Ball	Up to 3"	300 psi.	32A	930-TF	S217-BR-R-T WAT-OP

2. Balancing valves shall be non-lubricating concentric plug (ballcentric) type with adjustable stop valve shall be rated for 175 lb. W.O.G. or 400 lb. W.O.G. Valves shall be as manufactured by DeZurik or approved equal.

### 3. Domestic Water

- Gate Valves - Fairbanks Fig. 0250-FB
- Check Valves - Fairbanks Fig. 0500-FB
- Pressure Reducing Valves - Cash Acme Type "EHR"
- Vacuum Breaker - Watts Regulator Co. Mod. No. 288A.C.

### K. Pipe and Valve Identification

- Provide and affix a set of approved adhesive bands identifying the system and direction of flow.
- Each set shall consist of one band on which the name of the service is printed in letters not less than 1 inch high.
- Bands shall be in colors as indicated below and shall conform to ANSI Standard A-13.1.

System	Background	Letters and Arrows
Auxiliary Cooling Water	Green	Black

Adhesive bands shall be W.H. Brady Company, Seton Corp. or an approved equal.

4. Place a durable metal or plastic tag permanently affixed to convenient water shut off valves indicating the tenant name, floor served, and "SUPPLY" or "RETURN". Tag shall be 3\"/>

### L. Threaded Joints

Steel pipe threaded joints shall be made tight using only an approved pipe joint compound or tape, placed on the male thread only.

### CONDENSATE PUMP

Shall be as manufactured by Little Giant Company model # VCL-24-UI (S), 270 Gallons per hour at 1\"/>

### INSULATION FOR CONDENSATE WATER

Insulation: 1/2\"/>

### AUXILIARY DRAIN PAN REQUIREMENTS

- Make drain pan 1/2\"/>
- Install water sensor in drain pan along with necessary controls to sound local alarm and shut-down AC unit when activated by water in the pan.
- Water alarm shall be "Water Alarm" made By Dorfen, sensor unit model #CS-R (T), remote indicator unit model no. RI-2(T), power supply unit model PS-3 or approved equal. Locate alarm so that they can be easily heard in the occupied areas.

### EXECUTION

- AS req. - In occupied tenant areas shall be performed on other than normal working hours as directed by the Engineer.
- The Contractor shall notify the Engineer when shut-down of existing systems becomes necessary. Shut-down time shall be kept to a minimum.

### SHUT-DOWN

Request for shut-downs of main condenser water lines must be delivered to the Manager, WTC Operations, at least thirty (30) working days prior to the requested shutdowns and shall be subject to the final approval of the Manager, WTC Operations.

### BALANCING

The Contractor shall provide the service of an air balancing and hydronic testing specialist who specializes in Heating, Ventilation and Air Conditioning systems. Perform air balancing in accordance with sheet metal and air conditioning Contractors National Association (SMACNA).

### SUBMITTALS

Submit for approval three (3) sets of shop drawings of ductwork, piping and details. Submit three (3) sets of existing data for A/C Unit, ceiling diffusers, valves, accessories and three (3) copies of air balancing data report.

### APPLICABLE STANDARDS, CODES AND PUBLICATIONS

This entire installation shall be manufactured, tested and installed to conform, as a minimum, to provisions of the following codes and standards except where stricter requirements are specified elsewhere herein or shown on the contract drawings.

- National and New York Electrical Code
- National Fire Protection Association (N.F.P.A.)
- New York City Building Code
- Underwriters Laboratories, Inc. (U.L.)
- American National Standards Institute Inc. (A.N.S.I.)

### CONTROLLED INSPECTION

1. The ventilation system shall not be placed in operation until it has been tested and inspected in accordance with the requirements of the New York City Building Code, section C25-1301.2.

2. The controlled inspection shall be made and witnessed by a licensed professional engineer, employed by the contractor, who shall be approved by the Engineer-of-Record, as part of the work of the sub-contract.

### ESTIMATED SUPPLEMENTAL COOLING LOAD

The estimated supplemental cooling load for this Tenant Alteration Application is 8.5 Tons.

### FIRE DAMPER NOTES

- All fire dampers shall be rated to maintain the rating of the fire separation. They shall be approved and labeled by Underwriters Laboratories (U.L.) and New York City Board of Standards and Appeals (B.S.A.). Installation shall be in accordance with this drawing. Dampers shall be similar and equal to Type A as manufactured by Air Balance Inc. Dampers shall be Air Balance Inc. Air Damper Mfg. Corp. or Airstream Products Inc. A copy of the New York City Board of Standards and Appeals Calendar Item showing approval of the proposed fire damper shall be submitted for record.
- All work shall conform, as a minimum, with ASHRAE & SMACNA.
- Connections between collar and ductwork shall be breakaway type such as "S" slip, crimp, or other slip type in accordance with SMACNA Plate 15A, 4th Edition, and Plate 1, SMACNA Fire Damper Guide, 1970.
- Fire damper sleeve at partition of hollow fire rated construction shall be 14 U.S. Standard gauge sheetmetal in conformance with New York City Building Code C25-804.5 (e).

- Taps shall not be of lighter gauge than connecting duct-work. Minimum gauge shall be 18.
- Fire damper and taps shall be attached to sleeve by spotwelding. Welds for attaching damper shall be in two (2) rows, six (6) inches apart, minimum two (2) welds per side. Welds for taps shall be one (1) row, two (2) inches apart.
- Retaining angles shall be placed on both sides of wall and secured to sleeve with No. 10 sheet metal screws or 1/4\"/>

6. Fire damper and taps shall be attached to sleeve by spotwelding. Welds for attaching damper shall be in two (2) rows, six (6) inches apart, minimum two (2) welds per side. Welds for taps shall be one (1) row, two (2) inches apart.

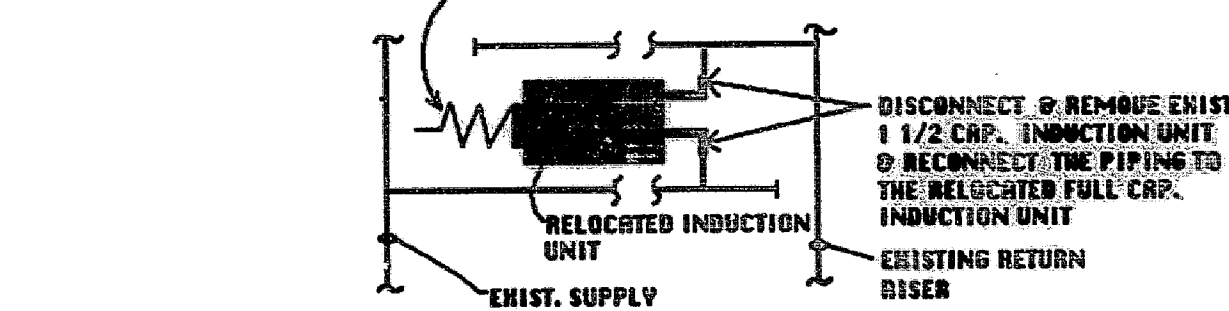
7. Retaining angles shall be placed on both sides of wall and secured to sleeve with No. 10 sheet metal screws or 1/4\"/>

8. The contractor shall seal all joints of the sleeve with sealant. The joint between taps and ductwork shall be made tight and secured by No. 10 sheet metal screws (one per side of rectangular duct, or three per round duct), sealed with sealant and then taped. All joints shall be airtight. Sealant shall be 3M Company No. 880 or approved equal and tape shall be Gray Vinyl Duct Tape as manufactured by Nashua Corp. or approved equal.

9. To allow for expansion, dampers shall have a top clearance equivalent to 1/8\"/>

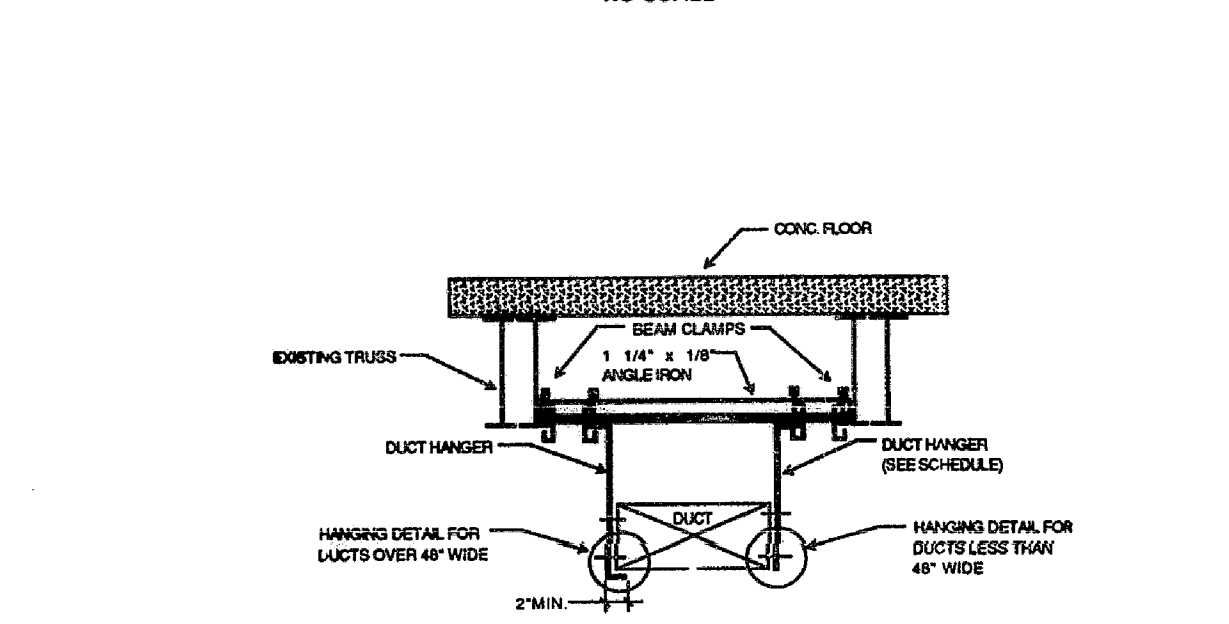
10. Access door shall be placed on either side of the sleeve only. If the side installation does not permit access to the damper for inspection and maintenance, the door may be placed on the bottom of the sleeve. In any event, access to the fire damper must be assured.

DISCONNECT EXISTING FLEXIBLE CONNECTION & RECONNECT TO RELOCATED INDUCTION UNIT

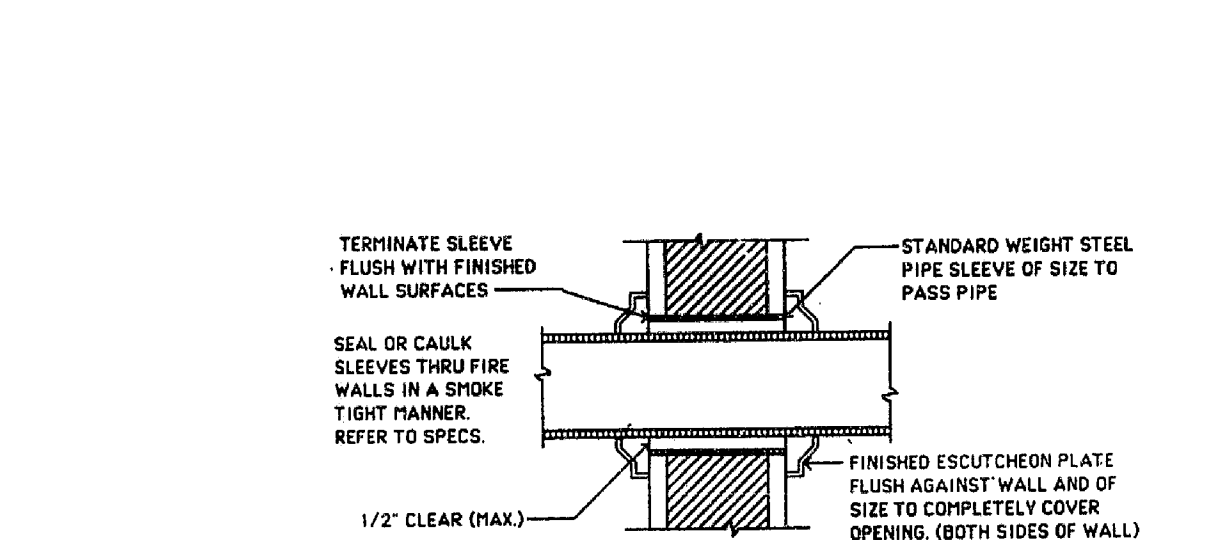


### SCHEMATIC PIPING CONNECTIONS TO THE RELOCATED INDUCTION UNIT

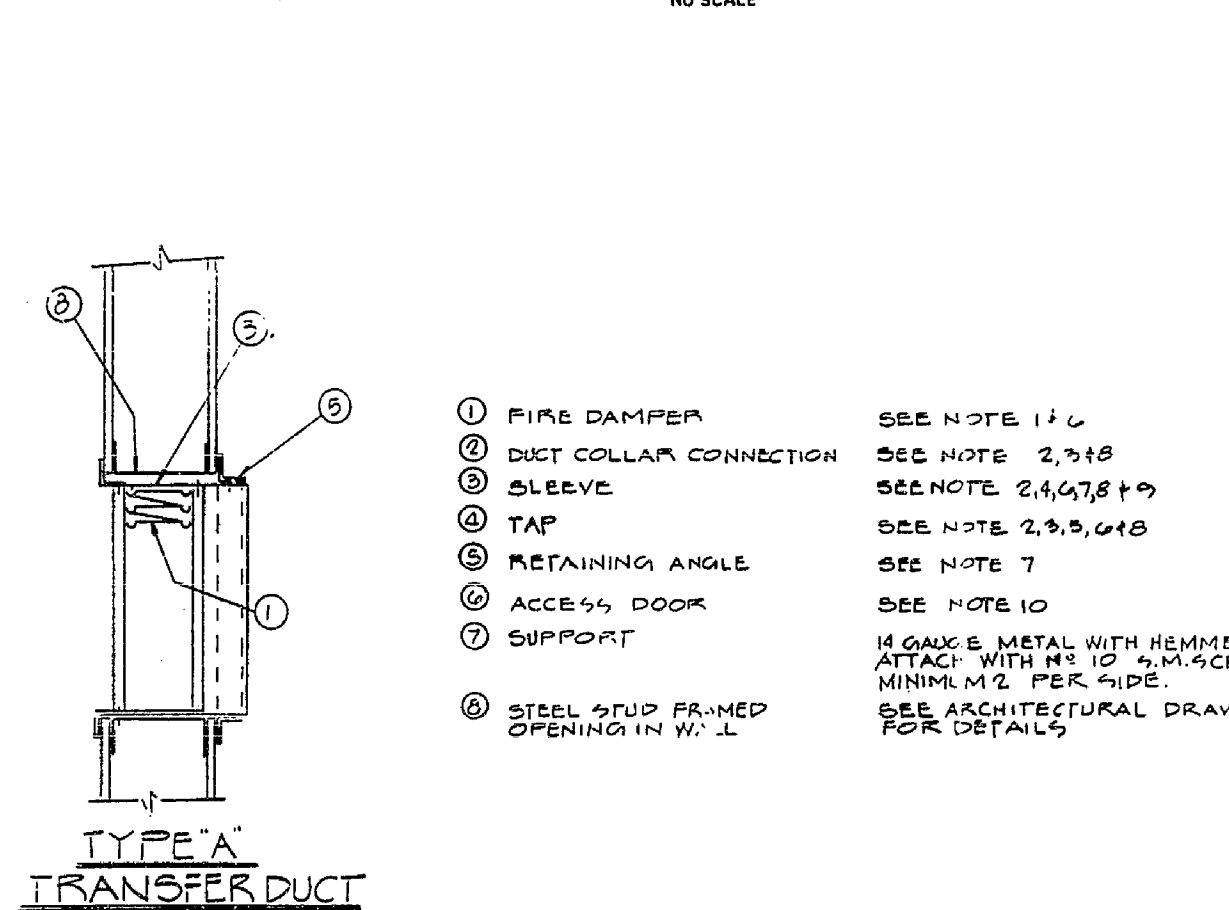
NATURAL COPPER PIPE SIZES  
NO SCALE



### DUCT HANGING DETAIL AND SCHEDULE OF SUPPORTS



### TYPICAL DETAIL OF PIPE THRU RATED WALL



### TYPE A TRANSFER DUCT

## VENTILATION INDEX

RR	RRR	P	VOLUME	VENT. IND.	REQ. SUP. CFR	REQ. RET. CFR	REQ. SUP. CFR/REQ	REQ. RET. CFR/REQ	ACT. SUP. CFR/ACT	ACT. RET. CFR/ACT
1	2320	84	18560	497	2784	2784	1.2	1.2	1.2	1.2
2	180	1	1280	2880	64	64	0.4	0.4	0.5	0.5
3	140	2	1280	1280	70	70	0.5	0.5	0.7	0.7
4	110	5	660	393	152	152	1.2	1.2	1.4	1.4
5	90	2	720	810	81	81	0.9	0.9	1.1	1.1
6	270	3	2160	1218	162	162	0.6	0.6	0.7	0.7
7	160	1	1280	2880	64	64	0.4	0.4	0.5	0.5
8	180	0	18560	497	2784	2784	1.2	1.2	1.2	1.2
9	180	0	18560	497	2784	2784	1.2	1.2	1.2	1.2

2. 18560 - 18560 Mechanical ventilation room - No occupancy

## JUSTIN PC ARCHITECTS

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## JOHN C. WESTRICK & ASSOCIATES

CONSULTING ENGINEERS

2110 MAPLE AVE. SOUTH PLAINFIELD, N.J.  
07080 908 561-4170

DATE	ISSUED TO	PR	IR
4/18/92	PORT AUTHORITY FOR APPROVAL	12	-
4/18/92	C.F.S.G.	2	-
6-10-92	PORT AUTHORITY FOR APPROVAL	12	-
8-25-92	PORT AUTHORITY FOR APPROVAL	12	-

CANTOR, FITZGERALD  
SECURITIES CORP.  
105th FLOOR  
ONE WORLD TRADE CENTER, NEW YORK N.Y.

PROPOSED ALTERATION TO  
G.S.B. TRADING ROOM  
MECHANICAL SPECIFICATIONS,  
VENTILATION INDEX AND DETAILS

PROJECT NO. 92119  
SCALE AS SHOWN  
DRAWN BY PE  
CHECKED BY JCW  
DATE 4/27/92

DRAWING NO.  
105 R - M 3